

CLAIMS

What is claimed is:

1. A method of controlling an HVAC system comprising the steps of:
  - (1) detecting whether a stage of an HVAC component is a failed stage; and
  - (2) removing the failed stage detected in said step (1) from a staging sequence.
2. A method as recited in claim 1, wherein said step (1) further comprises the step of:

communicating a health status of the HVAC component to a controller.
3. A method as recited in claim 1, wherein said step (1) further comprises the step of:

determining whether a communication link exists between the HVAC component and a controller.
4. A method as recited in claim 1, wherein said step (1) further comprises the step of:

communicating a temperature of a controlled area to a controller.
5. A method as recited in claim 1, wherein said step (1) further comprises the step of:
  - (a) monitoring a temperature of a controlled area;
  - (b) inferring whether the stage has failed from a relationship between the temperature of the controlled area and a time period.
6. A method as recited in claim 5, wherein said step (b) further comprises the step of:
  - (a) monitoring a slope of the relationship between the temperature of the controlled area and the time period.

7. A method as recited in claim 5, wherein said step (b) further comprises the step of:

(a) monitoring a rate of change of a relationship between the temperature of the controlled area and the time period.

8. A method as recited in claim 1, further comprising the steps of:

- (a) periodically attempting communication with the failed stage;
- (b) identifying whether the failed stage has become functional; and
- (c) returning the failed stage to the staging sequence in response to said step (b).

9. A method as recited in claim 8, wherein said step (b) further comprising the step of:

- (i) identifying a positive communication with the failed stage.

10. A method of controlling an HVAC system comprising the steps of:
  - (1) monitoring a rate of change of a relationship between a temperature of a controlled area and a time period for a first stage of an HVAC component;
  - (2) determining whether the first stage is a failed stage in response to said step (1); and
  - (3) removing the failed stage determined in said step (2) from a staging sequence.
11. A method as recited in claim 10, wherein said step (1) further comprises the step of:

determining whether the rate of change is greater than a prior rate of change of a prior stage of the HVAC component.
12. A method as recited in claim 10, wherein said step (1) further comprises the step of:

comparing the rate of change to a stored rate of change for the first stage.
13. A method as recited in claim 12, further comprises the step of:

inputting the stored rate of change into a controller which communicates with the HVAC component.
14. A method as recited in claim 12, further comprises the step of:

learning the stored rate of change over a multiple of cycles of the first stage.
15. A method as recited in claim 14, further comprises the step of:

determining a configuration of the HVAC component in response to learning the stored rate of change of a multiple of stages comprising the first stage.
16. A method as recited in claim 14, further comprises the step of:

incorporating a gain into a control algorithm for the first stage in response to the stored rate of change to obtain a desired rate of change.

17. A method as recited in claim 14, further comprises the step of:  
relating a recovery time period to the stored rate of change to achieve a designated temperature at a desired time.

18. A method of controlling an HVAC system comprising the steps of:
- (1) monitoring a first rate of change of a first relationship between a temperature of a controlled area and a first time period for a first stage of an HVAC component;
  - (2) monitoring a second rate of change of a second relationship between the temperature of the controlled area and a second time period for a second stage of the HVAC component;
  - (3) determining whether the second stage is a failed stage in response to said steps (1) and (2); and
  - (4) removing the failed stage determined in said step (3) from a staging sequence.
19. A method as recited in claim 18, further comprises the step of:  
determining a configuration of the HVAC component in response to said steps (1) and (2).
20. A method as recited in claim 18, wherein said step (3) further comprises the step of:  
determining if the second rate of change is less than the first rate of change; and  
determining that the second stage is a failed stage.